

REMARKS

In the Office Action dated February 16, 2005, claims 1-15 were rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over U.S. Patent No. 5,888,884 ("Wojnarowski") in view of U.S. Patent No. 6,201,631 ("Greywall"). In response, Applicant has amended the independent claim 10 to more clearly distinguish the claimed invention from the cited references. As amended, Applicant respectfully asserts that the independent claim 10 is neither anticipated nor obvious in view of the cited references, as explained below. Furthermore, Applicant respectfully asserts that the Office Action has failed to establish a *prima facie* case of obviousness for the independent claim 1. In view of the claim amendment and the following remarks Applicant respectfully requests the allowance of the pending claims 1-15.

A. Patentability of Independent Claim 1

The Office Action has rejected the independent claim 1 under 35 U.S.C. §103(a) as allegedly being unpatentable over Wojnarowski in view of Greywall. However, the Office Action has failed to establish a *prima facie* case of obviousness for claim 1 since there is no valid suggestion or motivation to combine the teachings of the cited references. As such, Applicant respectfully asserts that claim 1 is not obvious in view of the cited references, and thus, should be allowed.

The independent claim 1 recites a semiconductor structure comprising:

"a semiconductor core having a side surface;
a layer of insulating material on said side surface; and
electrically isolated electrodes arrayed along said layer of insulating material on said side surface, said electrically isolated electrodes including a conductive material having etch selectivity with respect to said insulating material."

The Office Action correctly states on page 4 that "Wojnarowski fails to teach the conductive material having etch selectivity with respect to the insulating material." However, the Office Action further states that "Greywall teaches using conventional deep reactive ion etch system (DRIE) to etch silicon/polysilicon/silicon oxide structure where an etchant having etch selectivity with respect to the oxide/insulating material" and that "Greywall further teaches using a conventional

conductive electrode material including a silicon based material such as doped polysilicon or aluminum.” In conclusion, the Office Action states that “[i]t would have been obvious to a person of ordinary skill in the art at the time invention was made to incorporate the conductive material having etch selectivity with respect to the insulating material as taught by Greywall so that the electrode profile can be improved and undercut can be prevented in Wojnarowski’s structure.”

To establish a *prima facie* case of obviousness, the following three basic criteria must be met, as set forth in MPEP §2143:

“First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all of the claim limitations.”

Applicant respectfully asserts that there is no suggestion or motivation in the cited references to combine the teachings of Greywall and Wojnarowski to derive the claimed invention. As stated in the Office Action, Greywall teaches using DRIE to etch silicon/polysilicon/silicon oxide structure, which is a silicon-oxide-silicon substrate having a bottom silicon layer 50 and a top silicon layer 55, as described in column 5, lines 29-34. Specifically, Greywall describes in column 5, lines 50-61 that DRIE can be used to form cavities 9 in the bottom silicon layer 50. However, there is no mention in Greywall of any other use for DRIE. Thus, the cited teaching of Greywall with respect to DRIE has nothing to do with electrodes on an insulating material on side surfaces of a semiconductor core, which the Office Action has admitted that Wojnarowski fails to teach as including “a conductive material having etch selectivity with respect to said insulating material.”

As stated in the Office Action, Greywall also teaches using a conventional conductive electrode material including a silicon-based material such as doped polysilicon or aluminum. However, this conductive electrode material is used for interconnects 70 and electrodes 80 that are formed on a major surface of a base substrate 75, as shown in Fig. 7E, not for electrodes on an insulating material on side surfaces of a semiconductor core. Thus, the cited teaching of Greywall with respect

to the conductive electrode material does not suggest the use of the conductive electrode material for “electrically isolated electrodes arrayed along said layer of insulating material on said side surface [of the semiconductor core],” as recited in claim 1. Furthermore, Greywall does not mention the use of DRIE to form the interconnects 70 and the electrodes 80. Thus, the two cited teachings of Greywall are not related, and thus, do not suggest or motivate using DRIE to etch the conductive electrode material including a silicon-based material such as doped polysilicon.

Since the two cited teachings of Greywall are NOT directed to electrodes on an insulating material on side surfaces of a semiconductor core, Applicant respectfully asserts that there is no suggestion or motivation to combine the teachings of Greywall and Wojnarowski to derive the claimed invention. The only “motivation” for combining the teachings of Greywall and Wojnarowski is the rationale set forth by the Examiner, which is not supported by the cited references. Furthermore, the asserted “motivation” is not appropriate for the Wojnarowski structure since the electrodes 62 on the side surfaces of the structure are not formed by etching but rather by sawing a wafer 30 using a dicing saw 700, as illustrated in Fig. 7 and described in column 7, lines 54-61. Since etching is not involved in forming the electrodes 62, the asserted “motivation” of combining the teachings of Wojnarowski and Greywall “so that the electrode profile can be improved and undercut can be prevented in Wojnarowski’s structure” is not a valid motivation. Therefore, Applicant respectfully asserts that claim 1 is not obvious in view of the cited reference of Wojnarowski and Greywall, and thus, should be allowed.

B. Patentability of Amended Independent Claim 10

The Office Action has rejected the original independent claim 10 under 35 U.S.C. §103(a) as allegedly being unpatentable over Wojnarowski in view of Greywall. In response, Applicant has amended claim 10 to more clearly distinguish the claimed invention from the cited references. As amended, claim 10 recites a semiconductor structure comprising:

“a semiconductor core having a major surface and a side surface, said major surface being orthogonal to said side surface;
a continuous layer of insulating material on said side surface; and

electrically isolated electrodes arrayed along said continuous layer of insulating material on said side surface such that said electrically isolated electrodes extend substantially in a direction orthogonal to said major surface, said electrically isolated electrodes including conductive material having etch selectivity with respect to said insulating material.”

The cited references of Wojnarowski and Greywall do not disclose “electrically isolated electrodes arrayed along said continuous layer of insulating material on said side surface,” as recited in the amended claim 10. Greywall does not disclose any electrode on a layer of insulating material on a side surface of a semiconductor core. Wojnarowski discloses a single metallization on an insulating material on a side surface of a substrate. However, Wojnarowski does not disclose multiple “electrically isolated electrodes arrayed along said continuous layer of insulating material on said side surface,” as recited in the amended claim 10. Therefore, the amended independent claim 10 is neither anticipate nor obvious in view of the cited references. As such, Applicant respectfully requests that the amended independent claim 10 be allowed.

C. Patentability of Dependent Claim 2-9 and 11-15

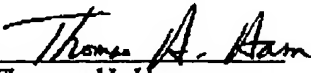
Each of the dependent claims 2-9 and 11-15 depends on one of the independent claims 1 and 10. As such, these dependent claims include all the limitations of their respective base claims. Therefore, Applicant submits that these dependent claims are allowable for at least the same reasons as their respective base claims.

Applicant respectfully requests reconsideration of the claims in view of the remarks made herein. A notice of allowance is earnestly solicited.

Respectfully submitted,

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